Management Analysis & Development

Minnesota Department of Public Safety

Statewide Video Conference Technology for Emergency Management

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Contents

Executive Summary

The Minnesota Department of Public Safety, Homeland Security and Emergency Management (HSEM), is the lead agency for developing and maintaining the state's emergency management system and structure. HSEM asked Management Analysis & Development to identify existing video conference technology (VCT) sites for county emergency managers' use and locations requiring VCT investments. HSEM's ultimate goal is to ensure every county emergency management program can participate in regional and statewide video conference calls.

This needs assessment rated county and district-court video conferencing sites with an A to D scale based on the equipment's proximity and portability to the county's emergency operations center (Table 1). All emergency management programs in regions 2 and 6 (Northeast and Metro) recently purchased video systems. For the other regions:

- Region 1 (Southeast) has four county EOCs with no viable options ("D" rating). The majority of other counties have county-owned portable equipment.
- Region 3 (Northwest) has one county EOC with no viable option and six with nearby sites with fixed equipment ("C" rating).
- Region 4 (West Central) has six county EOCs with no viable options and four nearby sites with fixed equipment.
- Region 5 (Southwest) has six sites with fixed equipment. Most of the region's "B" and "C" sites are court-owned and five counties have no secondary video site nearby.

Table 1. Rating of existing video sites for emergency management

Emergency Management Region	Counties with this rating			
	A	B	C	D
Region 1 Southeast	2	10		4
Region 2 Northeast	11			
Region 3 Northwest	2	5	6	1
Region 4 West Central	2	6	4	6
Region 5 Southwest	3	9	6	
Region 6 Metro	10			
State total	30	30	16	11

HSEM should consider allocating funds in this order: "D" counties, "C" counties with court-owned equipment, then all remaining "C" counties. After all "D" and "C" counties are equipped, then HSEM should start funding "B" counties and "A" counties with older systems. If HSEM prefers to allocate funds regionally, the recommended priority is: West Central, Southeast, Northwest and Southwest.

Creating a statewide emergency management video conferencing network will require significant planning and training time for state and local emergency management staffs, but the improved communication and travel time savings make it worthwhile.

Introduction

The Minnesota Department of Public Safety, Homeland Security and Emergency Management, (HSEM) is the lead agency for developing and maintaining the state's emergency management system and structure. Through policy direction and grant funding, the office assists local emergency managers to prepare for, respond to, and recover from major emergencies and disasters.

In 2009, local emergency managers submitted approximately $1 million in funding requests for video conference technology (VCT). In response, HSEM asked Management Analysis & Development to identify existing VCT sites for emergency managers' use and locations requiring VCT investments.

This document contains information on:

- The potential uses of video conferencing for scheduled, non-emergency meetings and emergency events;
- An inventory and rating of video conferencing sites located in or near each county's emergency operations center (EOC);
- Technical standards for grant-funded video conferencing systems; and
- Initial system and ongoing costs.

HSEM's Technology Work Group provided invaluable input and guidance. A subcommittee developed the technical standards. Management Analysis & Development is solely responsible for the inventory and rating of video conferencing sites; Work Group members may or may not agree with the results. Work Group members were:

Cathy Clark, HSEM Field Services; chair
Amy Card, HSEM – Region 5
Becki McDonald, Hennepin County
Beryl Wernberg, Beltrami County
Bruce Zimmerman, Office of Enterprise Technology
Don Ericson, Kandiyohi County
Gary Peterson, HSEM – Region 6
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Jim Reinert, Murray County
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John Dooley, HSEM Operations
Kari Goelz, HSEM Operations
Kristi Rollwagen, HSEM Operations
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Mark Nelson, Office of Enterprise Technology
Mary Hilbrand, HSEM – Region 3
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Stacy Hermanson, City of Minneapolis

Potential Uses for Video Conferencing

This project's consultant interviewed five HSEM regional program coordinators, a HSEM Operations staff member, and six local emergency managers or technology staff to identify non-emergency and emergency uses of video conferencing technology (VCT). Key points are:

- Several interviewees are knowledgeable about VCT. Others have a positive impression and want to learn more about its potential for emergency management.
- All interviewees said travel time savings would be significant and outweigh the disadvantages to not meeting in-person.
- Many opportunities exist to use VCT for non-emergency, scheduled purposes on a monthly basis, but face-to-face meeting are desired in some cases.
- Many of the meeting formats, such as information sharing, updates, question and answer sessions, and presentations are well suited for VCT.
- One concern is ensuring that emergency managers are familiar with and frequently use the technology. Using VCT for non-emergency meetings builds proficiency.
- Emergency use of VCT is more likely during the preparedness and recovery phases than the response phase. Field video capability would be very beneficial.
- Daily briefings are the primary emergency use, but on-demand is necessary, too.
- County-to-state and regional video sessions are the most likely uses initially during emergencies. But statewide use and sessions among levels of government and non-government agencies could occur, too.
- The VCT should be located in the emergency operations center (EOC) or as close to it as possible. The equipment should be portable if not permanently located in the EOC or if the alternative EOC is activated.
- The VCT site must be accessible during an emergency, provide physical and network security, and have support system redundancy.
- A "one-size-fits-all solution" may not work given intra- and inter-regional differences. More than one VCT method might be desirable, such as stationary sites, PC-based, and portable ones.

Non-Emergency, Scheduled Uses

Interviewees identified a number of regular meetings conducted via conference call or in-person that are suitable for VCT. Some noted that VCT can create opportunities for more frequent meetings or facilitate quickly scheduled ones to meet a pressing deadline. Meeting formats are typically informational presentations, discussions, and question and answer sessions. Visual aids are often PowerPoint presentations, handouts and maps, usually distributed by e-mail beforehand. White or "smart" boards and videos/DVDs may be used. Regular meetings include:

- County peer review of emergency plans (Regional Review Committees);
- Interoperability radio boards, advisory committees, and sub-committees (RRB and RAC);
- Multi-county or regional planning on shared grants, standardized procedures, and other issues of mutual interest;
- Public health planning and planning with other local, state, and federal entities;
- Regional policy and steering committees;
- Regional program coordinators and St. Paul staff;
- Regional planning exercises;
- Presentations from state agency staff; and
- Pre-planning for approaching storms or likely floods.

Interviewees said regional quarterly meetings should be in-person, but VCT could allow monthly briefings on some quarterly meeting topics or monthly legislative and security updates. The monthly briefings would allow more timely distribution of information and make the regional meetings more productive for the in-person topics. Four people noted that other responder disciplines could use the equipment, too.

Several interviewees have used VCT rooms. Several described the difficulty in scheduling another organization's room. Two interviewees said it "saves a lot of travel time to hear about paperwork." One region's emergency managers conduct video sessions by having participants travel to two or three sites. One person said "conference calls work if conducted well," and another was unsure if a PC camera is beneficial without trying it. Several said web camera and webinar experiences have been positive.

Interviewees said VCT can eliminate long travel time, allow people to "attend" more meetings, and widen the participant base to include individuals who would not attend due to distance. Some meetings are much shorter than the travel time itself. Sessions can be recorded for non-participants' viewing or for future reference. One person said VCT meetings can be more productive because they prevent people from sidetracking to other issues. Two said VCT can promote interaction with other states' emergency managers. These advantages outweigh potential shortcomings from not meeting in person.

Many interviewees said some people will be reluctant to use VCT, making training and user-friendly equipment critical. One said the incentive to avoid travel and overtime will encourage people to use VCT. Interviewees said other potential limitations are the inability to use VCT with key state and federal partners that do not have it, the difficulty of preventing people without the proper security clearance to be present during a VCT session, equipment start-up and ongoing licensing costs, and insufficient capacity to have

all counties dialed into a state EOC video session. One person said smaller counties' IT staff may require more training with the technology. Several interviewees noted the challenges of ongoing operating costs and ensuring connectivity.

Emergency Uses

Daily briefings would be the primary emergency use, and are currently conducted by teleconferencing and e-mail distribution of maps and other key documents. Interviewees said video communication could greatly enhance the briefings. Participants can see who is speaking and follow him or her, using maps or a white board while describing the situation. It is helpful to observe group discussions, someone's body language, or how fatigued people are, though several indicated that document viewing is more important. Another advantage is that everyone receives the same information simultaneously. Other potential topics involve making decisions, such as considering an evacuation order, discussing logistics and resource needs, or holding FEMA applicant briefings.

VCT use would begin once the emergency operations center (EOC) is activated and perhaps only during the recovery phase. During the response phase, key personnel are in the field and unavailable for a video conference, or the phase is short lived. One person said "a cell phone is on your hip and can connect with audio immediately" while VCT may take time for equipment setup and scheduling. This person and another interviewee said teleconferences work in emergencies.

Others said VCT would enhance communication with all parties: county-to-state EOC, among counties, within the multi-agency coordinating group, and with on-site incident command personnel. In the field, video can effectively show the damage and maps while discussing the situation. One person noted that wireless networks have excellent coverage for connecting laptops in the field.

Interviewees said that VCT should be available on demand. Daily briefings occur on set schedules, but an emergency situation may require unplanned conferencing when an event's conditions suddenly change (wildfire flare up or evacuation order) or to quickly address erroneous media reports and rumors. Two said they can access their county's VCT room during an emergency. VCT use may diminish from daily to once per week as the event "winds down."

Numerous entities could participate simultaneously in a video session from different sites:

- Affected counties and their regional program coordinators;
- The state EOC;
- Minnesota departments of Agriculture, Health, Natural Resources, and Transportation;
- The National Guard;
- The National Weather Service and Army Corps of Engineers;
- City and township leaders and department heads; and
- The Red Cross, private companies, and other non-government agencies.

At a county EOC, the number of video session participates will vary by event, but most interviewees said the "core" group has 10 to 15 individuals, representing each responding discipline and local experts for the particular emergency. Two thought fewer than ten people, representing section chiefs, would participate. Two interviewees said over 50 could be involved, depending on the session's purpose.

Location and facility criteria

Nearly all interviewees said the VCT should be in the EOC or close to it. Key decision makers will not leave the EOC nor spend precious time traveling to another location for a video session. The VCT should be in a separate room for controlling information dissemination and to minimize background sound and visual distractions. But sometimes a video session's large number of participants makes the EOC impractical. Two thought that a VCT room in the same building as the EOC might work, for example, the county commissioners' board room. Two interviewees said large jurisdictions may want systems in several buildings (county center, EOC public works ops center, or district offices).

One challenge is that some counties' EOCs are too small for the equipment or are not a designated location. Several interviewees said the equipment must be portable if not permanently located in the EOC, in case the alternative EOC is activated, or if no designated primary location exists. These places must have the required network connections, too.

Other important criteria are a location outside of known risk areas and accessible during the emergency, physical and network security, and support system redundancy so that the VCT is available during emergencies. Interviewees noted that EOCs typically meet these criteria. One person said redundancy includes two video sites for larger counties. Two thought that a higher- than-normal level of network security would be cost-prohibitive.

Non-EOC sites should have sufficient parking and be handicapped accessible, and have a large VCT room capacity with appropriate lighting and a wireless network. Two interviewees noted that the criteria for non-emergency purposes would be different.

Current local emergency management VCT systems

Three regions are undertaking VCT projects. In the Metro Region, Hennepin and Ramsey counties, Minneapolis and St. Paul, and the Airport Commission had VCT systems installed for the Republican National Convention. A lack of ongoing funding has shut down the network connections. The Metro Region's remaining eight counties have purchased VCT equipment for their EOCs. The main issue is establishing connectivity so that all sites can join a video session, and the Metro Region members are meeting soon to discuss solutions.

The Northeast Region is installing VCT in each of the eleven counties' EOCs. Duluth will host the bridging equipment that allows multiple sites to participate in a session. The Northwest Region is purchasing PC cameras and speakers for each emergency manager.

County-by-County Needs Assessment

The needs assessment identified and rated existing video conferencing sites for emergency managers' use. This information is a starting point for evaluating a county emergency management program's video conferencing options.[1] When using this information, understand that:

- New video sites are added or existing ones moved over time. Consult the Office of Enterprise Technology's video site directory for the latest information;[2]
- District court staff stated verbally that their video sites are available for emergency managers' use, but formal agreements and state district court administration approval would confirm availability; and
- The emergency manager may disagree with the video-site contact person on the equipment's availability for others' use and portability.

Results

Work Group members stated that the video conferencing equipment must be located in or near the emergency operations center; key decision makers will not leave the EOC nor spend precious time traveling to another location for a video session. Existing video conferencing sites were rated with an A to D scale based on the equipment's proximity to the EOC and portability (Table 1 and Appendix A).

The ratings provide an initial evaluation and do not capture all factors on a video site's suitability for emergency management's purpose. The "B" and "C" ratings differ by confirmation from the video contact person that the video conferencing equipment can be moved. A few emergency managers said their county's "B" rating should be a "C" because the equipment cannot be physically moved, or the owning entity will not allow it. In some cases, the feasibility of relocating the equipment to an EOC is unknown until tried. Nearly all "A" counties recently purchased video systems, but a few have older ones. One "A" county's equipment is not installed.

Table 2. Proximity of video conferencing systems to county EOC and system portability

Rating	Number of counties	Description
A	30	VCT is in the EOC or in a room next door.
B	30	VCT is in the same building or block as the EOC and can be moved to the EOC.
C	16	VCT is in same building or block but cannot be moved.
D	11	No viable VCT site (.2 miles or farther from EOC).
Total	87	

[1] The needs assessment unintentionally excluded tribal governments, the University of Minnesota, and the Metropolitan Airport Commission.

[2] http://www.mnet.state.mn.us/video/sites/white-pages.php?sort=city

Thirty "A" counties have video conferencing equipment in or next to the EOC. The twenty-one counties in emergency management regions 2 and 6 (Northeast and Metro) recently purchased video systems. The nine other counties are Hubbard, Kandiyohi, Lac qui Parle, Lake of the Woods, Le Sueur, Lyon, Nicollet, Renville, and Traverse.

Thirty "B" counties have video conferencing equipment in the same building or block as the EOC, and the video site contact person stated that the equipment was on a cart and not mounted to a wall or cabinet. Sixteen "C" counties have video equipment in the same building or block as the EOC, but the equipment cannot be moved. County departments, such as administration, public health, law enforcement, human services or social services, own half of the 46 sites. District courts own the other half (Table 2).

Table 3. Counties by site ownership and rating

	County-owned site (23 counties)	**District Court site (23 counties)**
B rating	▪ Region 1 (Southeast): Blue Earth, Dodge, Freeborn, Mower, Rice and Winona ▪ Region 3 (Northwest): Clay, Mahnomen, Marshall and Roseau ▪ Region 4 (West Central): Benton, Pope and Todd ▪ Region 5 (Southwest): Brown and Redwood	▪ Region 1 (Southeast): Goodhue, Houston, Wabasha and Waseca ▪ Region 3 (Northwest): Becker ▪ Region 4 (West Central): Meeker, Mille Lacs and Wadena ▪ Region 5 (Southwest): Chippewa, Jackson, Martin, Murray, Pipestone, Sibley and Watonwan
C rating	▪ Region 3 (Northwest): Beltrami, Clearwater and Norman ▪ Region 4 (West Central): Douglas, Morrison and Stearns ▪ Region 5 (Southwest): Nobles and Rock	▪ Region 3 (Northwest): Kittson, Pennington and Red Lake ▪ Region 4 (West Central): Swift ▪ Region 5 (Southwest): Cottonwood, Lincoln, McLeod and Yellow Medicine

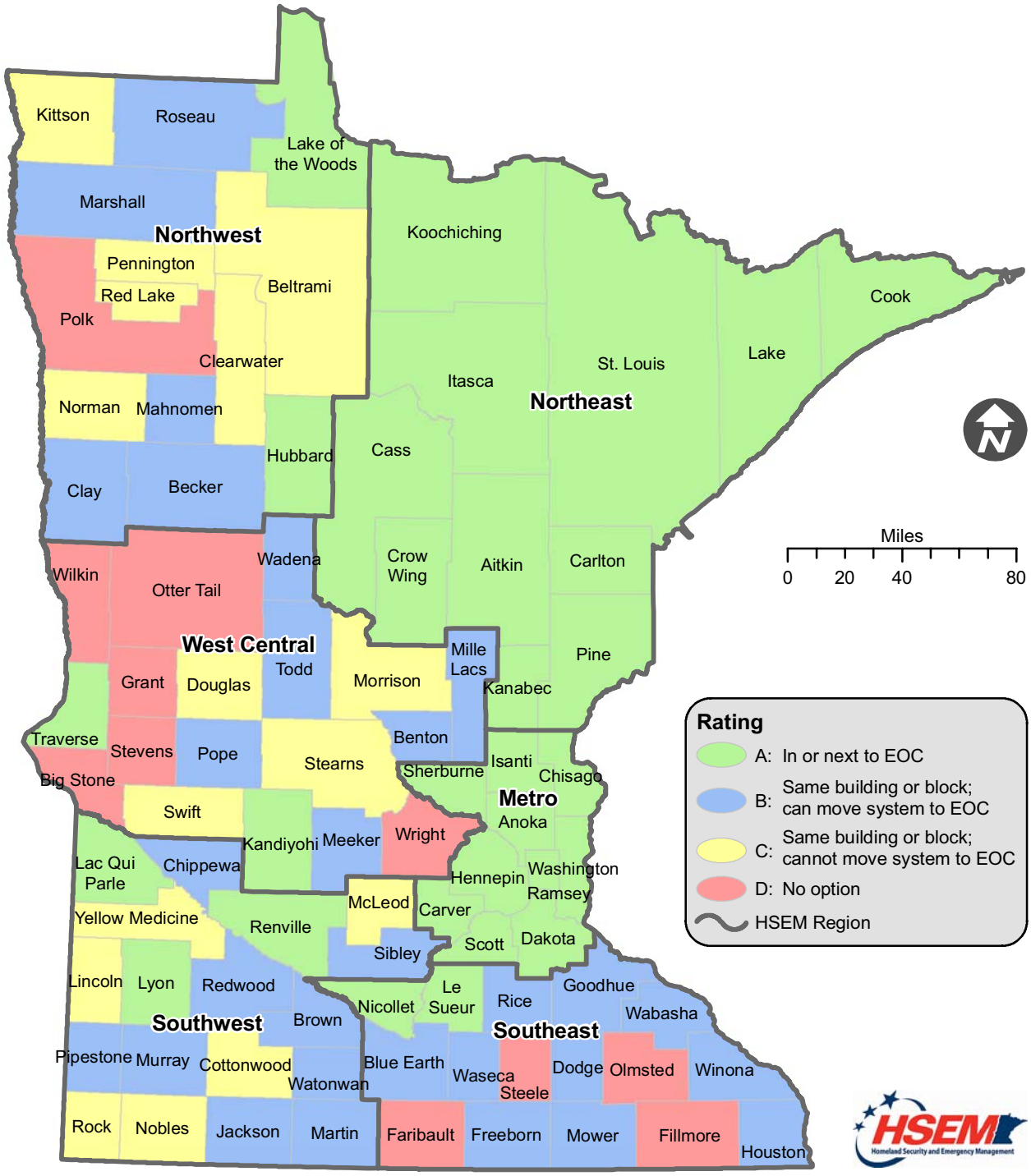
The district courts own eleven of the seventeen[3] potential Region 5 (Southwest) video sites, the highest proportion of any region. Counties own two-thirds or more of the potential sites in regions 1, 3, and 4.

Eleven of the 46 "B" and "C" counties have no alternative video conferencing site near the EOC and five are located in the Southwest Region.[4] Eight of the sites are court owned: Houston, Kittson, Lincoln, Meeker, Murray, Pennington, Waseca and Yellow Medicine. The three other are county-owned sites: Mower, Redwood and Rock. The remaining 35 "B" and "C" counties have at least two county- or court-owned sites in the same building or block as the EOC.

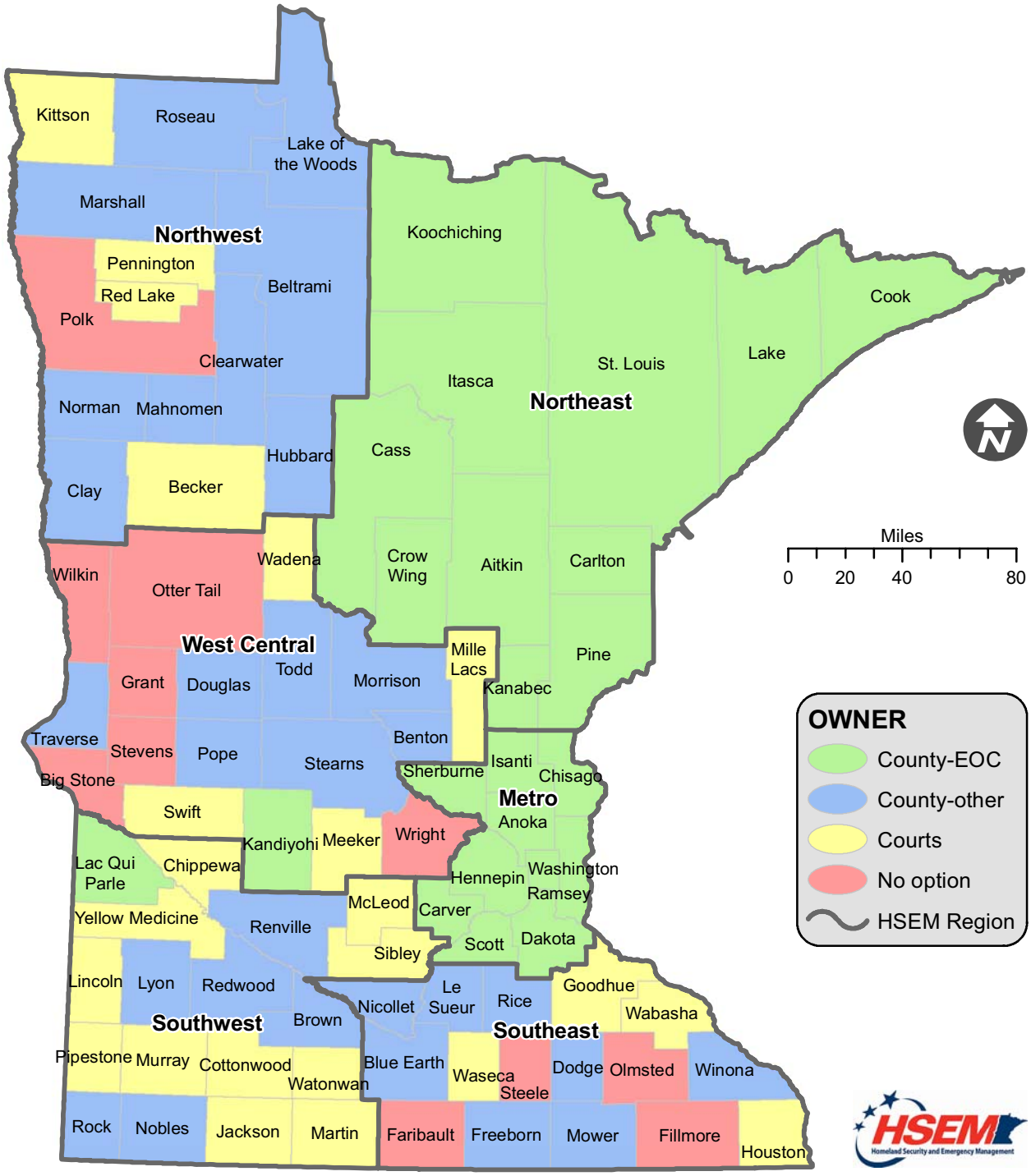
Eleven counties ("D") have no existing video conference site within .2 miles (two to three blocks) of the EOC; several are more than a mile from the county government center. Six Region 4 (West Central) EOCs have no viable options: Big Stone, Grant, Otter Tail, Stevens, Wilkin, and Wright. Four Region 1 (Southeast) counties have no options: Faribault, Fillmore, Olmsted, and Steele. Polk is the eleventh county (Region 3 – Northwest). The following maps illustrate the county ratings and system ownership.

[3] The Southwest Region has 18 counties, but one county's new EOC will own a video conferencing system.
[4] Other county, state or higher education sites exist in most of the county seats, but are not in the same building or block as the EOC.

Map 1: Proximity of video conferencing systems to county emergency operations centers (EOCs)



Map 2: Ownership of video conferencing systems for county emergency management



Emergency managers' feedback

The project consultant e-mailed each county emergency manager, asking whether he or she had any concerns using the identified potential site.[5] The e-mail text was:

> "I spoke with [name of video site contact] at your [county or courts] and determined that the [county department's or court's] video teleconference equipment at [location] could be available during an emergency event and also be available for scheduled, non-emergency uses, such as regional emergency management meetings. Do you see any problems using the video equipment for communication during an EOC-activated event or for a scheduled meeting?"

Fifty-six of 66 county emergency managers replied. Many did not have concerns. The most commonly raised ones were:

- The equipment is not located in the EOC;
- The owning county department or courts will not make the site available or it is heavily scheduled; and
- The EOC is not conducive to video conferencing (insufficient space, no network connections or no separate room within the EOC).

A few emergency managers said they need training, that the county bandwidth may not support video conferencing, or that the equipment must be set up quickly during an emergency event. Some thought the equipment would be readily available during an emergency, but a few did not.

The HSEM Technology Work Group requested that each county emergency manager review a draft version of Appendix A's inventory and rating table and answer these questions:

1. Does the county manager agree with the A – D rating given to his or her county? If not, why not?
2. Does the emergency manager have any additional comments than those listed in the last column?
3. Does the EOC have the necessary network connections and physical space for the equipment (exclude A-rated counties)?
4. Can the county's network support video equipment requiring up to 768 kilobits[6] per second in bandwidth without negatively affecting other video or data transmission?
5. Any impediments to moving the video equipment to the EOC: no elevator, narrow doors, etc. (B-rated counties only)?
6. Does IT staff have direct experience installing and maintaining VCT?
7. What is the emergency manager's familiarity with the equipment: no experience, some experience, very experienced?

[5] The 21 county emergency managers in Regions 2 and 6 (Northeast and Metro) were not contacted. A few of the other regions' emergency managers were called rather than e-mailed.

[6] The survey incorrectly used "kilobytes" but it does not appear to have affected most respondents' answers.

8. Does the Emergency Management Director currently work with the County IT staff on existing projects or not?

Each HSEM regional program coordinator e-mailed the preliminary table and survey questions to his or her region's emergency managers, except regions 2 and 6 (Northeast and Metro). Thirty of 66 emergency managers completed the survey. One regional program coordinator said he or she received no negative comments or questions and several county managers said their initial e-mail reply to the consultant was a sufficient response.

Four respondents disagree with their county's "B" rating, saying that equipment could not be easily moved or the courts will not share the system or will prohibit moving it. One person disagreed with a "C" rating because EOC-based video conferencing equipment is unnecessary and the county commissioners' site "is good enough for us."[7]

Respondents who agreed with their county's rating wrote about wanting EOC-based equipment, insufficient bandwidth to handle two or more simultaneous video calls, limited EOC space, and preferring other basic EOC-equipment first. Two respondents preferred having the video conferencing equipment in another room, not the EOC itself.

Eighteen of 30 emergency managers said their EOC has the necessary network connections and space for video conferencing equipment and three said their EOCs do not. The remainder skipped the question or said it "depends" for space availability. Twenty-three respondents said their networks can support 768-kilobit video calls, though several said no more than two simultaneous calls. Three respondents said "no" and the others were uncertain or skipped the question. Three respondents from "B" rating counties said it would be difficult to move the equipment to the EOC due to steps, equipment size, or permanent installation.

Eighteen of 30 respondents said their IT staff have experience with video conferencing equipment. Four others said IT staff had "some" or "limited" experience. The remaining respondents said their IT staff had no experience, but several expressed confidence in their IT staff's ability to install and maintain video conferencing equipment.

Almost three-quarters of respondents have little to no experience using video conferencing equipment, and the remainder have "some." A few said they are willing to learn. Nearly all said they work with their IT staff on existing projects.

[7] Three other emergency managers corrected information that changed their county ratings. One county rating changed from a "B" to an "A" (video equipment is in the EOC). Another changed from "B" to "C" (equipment was not moveable – consistent with the video-site contact's information), and the third changed from "D" to "C" (the EOC is within .2 miles of the equipment).

Other observations

The consultant's telephone calls with county or courts video-site contacts identified these issues:

- An emergency manager will need after-hours access to the building to use the video site during an emergency.
- The courts and public health and human services departments may have emergency uses for the equipment at the same time as the emergency manager.
- Judges will likely cancel court hearings during an emergency, making the video equipment available. If not, some courts have alternative hearing rooms.
- Smaller counties' courts have hearings only one or two days per week. Jury trials could require several days but are infrequent.
- Video conferencing is becoming more popular with all county departments, making it harder to schedule non-emergency uses in the future.

Assessment method

The project consultant:

1. Identified the closest, publicly owned video conference site to each county's emergency operations center (EOC), using the state Office of Enterprise Technology's video site "white pages" directory. This directory lists 1,100 video conferencing sites (rooms) owned by 275 public entities (higher education, state agencies, school districts, and counties). County and district court sites are often in the same building or block as the county EOCs.
2. Asked the county or court video site's contact person if the video site is in the same building or block as the county EOC, its availability for emergency uses and scheduled meetings, and its portability (can it be moved). Each EOC's address was compared to the video site's address, and proximity confirmed with the contact person. Sometimes, the site contact referred questions to county IT staff.
3. E-mailed the potential site's name and location to each county emergency manager and asked about any concerns. Nearly all emergency managers were familiar with the video site. If no potential site was found, the consultant confirmed that the EOC did not have the equipment (OET's white pages lists most but not all video conferencing sites).
4. Assigned an A to D rating based on the video contact person's information and emergency manager's feedback. Sometimes, the emergency manager disagreed with the contact person's assessment of site availability or portability. If the difference could not be resolved, the contact person's responses prevailed.
5. Asked the HSEM regional program coordinators to e-mail the draft inventory and ratings to emergency managers, asking if he or she agrees with the rating and requesting other information regarding EOC network connections and space, for example.

Technical Standards

The Division of Homeland Security and Emergency Management convened state staff and local emergency managers and technical staff to create standards and recommendations to ensure that grant-funded video conferencing equipment maximized efficiency and interoperability. These standards and recommendations apply to end-point equipment, network connection, staffing, and video-conference room.

These criteria guided the subcommittee's decisions:

1. Flexible, portable, and simple-to-use equipment and connections.
2. Interoperability with other video conference devices.
3. Sustainable costs to the emergency management program.
4. Each county emergency management program has its own equipment.
5. Security of the system.
6. Emergency Operations Center-based system (not field system).
7. Public meeting requirements supported.
8. Available for other public safety disciplines' use.

Definitions[8]

Bandwidth is a measure of available network capacity for transmitting voice, video and data. A county network connection must have sufficient capacity to support video calls and all other voice and data uses simultaneously. A video conference call requires up to 25 percent of some counties' connections.

End-point Equipment is a room-based video conferencing system (often called ITV) consisting of a video codec (defined below), cameras, monitors, microphones and speakers. Two types of equipment are group video conferencing systems and personal video conferencing systems:

1. Group video conferencing systems support several participants in one room through multiple cameras, microphones and large video screens, with connections to a PC, digital recorder, and other audio/visual equipment.
2. Personal video conferencing systems have a single, small monitor with built-in microphone, speaker and stationary, single-focus camera and a PC connection.

H.323 Standards ensure interoperability of different manufacturers' end-point and network equipment. H.323 is a similar concept to 800 MHz radio-band interoperability standards.

Minnesota's Network for Enterprise Telecommunications (MNET) is a public-private partnership delivering a statewide voice, video and data network for education, local governments, and state agencies. Nearly all state, county, courts and public higher-education video-conferencing sites connect through MNET.[9] Per statute, the state Office

[8] More-technical definitions are available at the end of this document.
[9] MNET home page: http://www.mnet.state.mn.us/index.php and network map: http://www.mnet.state.mn.us/data-net/general/maps.php.

of Enterprise Technology (OET) operates MNET as a shared resource using leased line connections from telecommunication providers.

Personal Computer (PC) Conferencing is a low-cost alternative to "true" video conferencing, but generally does not use the same standards and protocols. Video and audio performance is not as good as a video conferencing system's, but PC conferencing will perform as needed. This equipment cannot directly connect with video conferencing end-point equipment. Two types of PC conferencing are:

1. PC video conferencing uses the PC's processor, conferencing software and audio/video PC peripherals to video conference between similarly equipped PCs connected through the Internet.
2. Web or Net conferencing uses a web-based service provider, such as Cisco WebEx or Microsoft Live Meeting. The primary visual element is a shared view of the presenter's screen.

Site is the video conference system's physical location, usually a conference room or office.

State-County Collaboration Program (SCCP) is a partnership of eight state agencies and all county governments sharing the costs and benefits of maintaining secure and reliable network connections statewide. Currently, state agencies fund about 75 percent of the costs. In return, video conference rooms should be available for state agencies' use, based on the room's availability.

Video Codec is a coder-decoder device that translates, combines and compresses audio, video and data information for network transmission.

Video Conferencing is real-time, two-way interactive communication that enables face-to-face communication among people separated by distance. In a video conference call, all participating locations can equally see and hear each other.

Video Event is a meeting held via video-conferencing.

Video Network Infrastructure is equipment that establishes calls, manages bandwidth, connects three or more sites into a single video event and communicates between different networks. Other functions include system monitoring and management, site scheduling, and automated conference set-up.

Costs

Federal Homeland Security Grant Program funding can purchase equipment vetted against the Department of Homeland Security's authorized equipment list. Each year, HSEM will provide access to the updated list via:

https://www.rkb.us/FEMAGrants/DisplayFEMAGrants.cfm
(see the Authorized Equipment link on the web page's right side).

If approved, grant funding may fund the end-point equipment's purchase but not all recurring annual costs. Emergency management budgets may incur these two annual costs:

1. Maintenance: a hardware and software maintenance plan, which may cost up to $1,700 a year, depending on the end-point equipment purchase price.
2. Network: Additional bandwidth, or network capacity, to support another video conference site at the county, if necessary. This cost will vary by county depending on the number of existing video sites, current network connection capacity, and potential for cost-sharing with other county government entities.

Redirected travel savings could pay these annual costs. Additionally, video conferencing reduces staff's travel and overtime hours – improving overall productivity. Staffing to support video conference operational activities should also be considered when introducing this technology to maximize its benefits.

Subcommittee members

Subcommittee members met four times in December 2009 and January 2010 via video and PC conferencing. They drew heavily on their own experience and knowledge and the Office of Technology's video-conferencing web pages[10] to create these standards.

Beryl Wernberg, Beltrami County, chair
Becki McDonald, Hennepin County
Don Ericson, Kandiyohi County
Frank Balak, Waseca County
Jeremy Seibel, Beltrami County
Jim Reinert, Murray County
John Bowen, Crow Wing County
John Dooley, DPS-HSEM
Mark Nelson, OET
Mike Bromberg, Olmsted County
Rod Bibeau, City of Duluth
Ron Pula, Beltrami County
Stacy Hermanson, City of Minneapolis
Peter Butler, MAD, facilitator

Document version

Version 2: March 12, 2010. Direct comments and suggested additions or modifications to Cathy M. Clark, Director, Field Services Branch, Cathy.Clark@state.mn.us

[10] http://www.mnet.state.mn.us/video/video-conferencing/best-practices.php

Long-Range Plan for Emergency Management Video Conferencing

Video conferencing technology has demonstrated its effectiveness and efficiency in supporting emergency planning, preparedness and operations. However, limited funding requires incrementally building a statewide interoperable system over several years. Eventually, these investments will link over 100 jurisdictions' video conferencing end-points into a seamless, statewide communications infrastructure. The following goals will guide future investments in real-time, interactive communications:

Goal 1. Each city, county and state Emergency Operations Center (EOC) owns a stationary or mobile H.323 video group conferencing system. Mobile systems should remain connected at an alternative location (such as a conference room or the Emergency Manager's office) to support daily administration, operations and training.

Goal 2. Each video conference system is connected to a common, shared statewide network and management system with simplified inter-jurisdiction calling.

Goal 3. Local and regional network investments for video event scheduling, end-point management, multi-way conference connections, conference recording and media streaming are pooled to create a common, shared statewide emergency-management infrastructure to minimize costs and maximize simplified, interoperable communications.

Goal 4. PC-based video conferencing can be included in strategies to achieve Goals 1 to 3. PC-based systems can connect to sites without H.323 conference equipment, field-based operations or other sites within a jurisdiction. Due to limited funding, PC-based video investments may precede EOC-based group system investments, but are not an alternative, primary solution.

Goal 5. Emergency management personnel should be familiar with and routinely use web/net conferencing software in conjunction with audio conferencing to support administrative, operational, planning and training activities.

End-point Equipment Standards

In this section, "end-point equipment" is an H.323 video conference system that provides real-time, two-way video and audio communication. The two types of systems are personal/desktop video end-points and group conferencing systems. PC video conferencing and web/net conferencing technology are not H.323 video conference systems and are discussed separately.

These end-point equipment standards will assist local emergency managers to:

1. Identify the right equipment for their needs;
2. Simplify the purchasing process;
3. Promote common equipment platforms for end-user training and assistance; and
4. Ensure connectivity and interoperability to statewide video network infrastructure.

Local jurisdictions will own grant-funded equipment. Grant applications should state whether group conferencing room-based systems, personal conferencing systems or PC conferencing systems are being purchased. The following information provides guidance for equipment choices and options.

I. Use of state video-equipment contract

The Minnesota Department of Administration's Materials Management Division (MMD) worked with the Office of Enterprise Technology (OET) to establish video end-point equipment contracts. Based on extensive experience and on-going testing, Tandberg and PolyCom equipment work best with the State's video network infrastructure and protocols used on MNET, and ensure the highest quality performance. Purchasing this equipment expedites a video site's set-up and proper connection to MNET, resulting in MNET certification to begin video conferencing sessions.

Two emergency management regions have purchased Tandberg equipment, and OET has recently invested in an array of Tandberg video network infrastructure equipment. Tandberg equipment is the preferred choice for emergency management programs to provide the highest degree of interoperability.

Every local government is eligible to purchase from state contracts, but must register with MMD's Cooperative Purchasing Venture (CPV) program. Emergency managers should contact their purchasing department to confirm CPV membership or request enrollment. The two video-conferencing system vendors are:

1. MSpace (http://www.yourmspace.com/MN_State_Product_Catalog.php)
2. Tierney Brothers, Inc. (http://www.tierneybrothers.com/index.php?page=vconferencing)

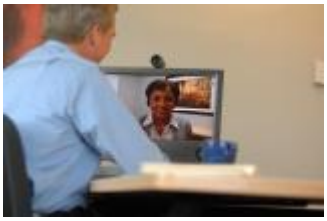
Both vendors' websites have a State of Minnesota web page or portal for state contract purchasing (unavailable as of 3/12/10). The state contract sets discount percentages from the vendor's price, and is effective until December 31, 2011.[11] A region's emergency management programs should buy as a group to obtain further discounts.

II. Recommended group (room) video-conferencing equipment

The state price discounts apply to all of the vendor's equipment and the contract does not specify equipment packages. Tandberg is the industry leader and is the preferred choice for emergency management programs. Tandberg offers many different models with similar functionality. The basic difference is the number of people who can easily participate in a video session via a desktop, small meeting room, or large conference room system.

A. Recommended equipment choices

Personal/Desktop – TANDBERG 1700
(one to three participants; see the technical definitions for a desktop system's limitations)



Small Room – TANDBERG Quick Set C20
(up to ten participants)

Large Conference Room –
TANDBERG Edge 95
(up to 20 participants with more observing, depending on screen size)

PolyCom is the alternative brand. It is compatible with MNET protocols and infrastructure and may be selected if other county end-points are PolyCom. However, video-call performance is generally better when all sites have the same brand, and users can assist each other more easily when they have the same remote controls. A region should buy the same make and model whenever possible to support cross organizational support and regional synergy in technology use and adoption.

[11] The Audio-Visual Products A-203(5) contract lists approved vendors, percentage price discounts, and general terms and conditions: http://www.mmd.admin.state.mn.us/pdf/A-203(5).pdf. Visit the vendor's website to see equipment choices and prices. MMD's secure website provides general information and updated contracts and requires a CPV access code: http://www.mmd.admin.state.mn.us/process/contract/.

B. Equipment specifications

High-definition (HD) cameras, video processors and screens provide overall higher picture quality than older standard definition equipment in service today. High-definition equipment is becoming the standard. All recommended systems are HD capable. However, HD video transmissions require more bandwidth per call, and the conference bridging equipment is more expensive. MNET's video conference transmission speeds provide the overall best performance for the bandwidth used, but are not true HD calls.

Purchased end-point systems should use the H.323 protocol for data, voice, and video transmission. The preceding Tandberg equipment choices have H.323 capability.

C. Peripherals and options

The basic video unit comes with all the necessary equipment to participate in a video conference session: pan-tilt-zoom camera, wireless remote control, microphone, cables, and codec. Few peripheral equipment or options are necessary. A monitor(s), and speakers are also required, and a cart, stand or cabinet to house equipment is desirable. Presenter software, such as TANDBERG's Natural Presenter Package (NPP), divides a video screen to show a PC desktop presentation and the presenter simultaneously. This split-screen functionality is required for all grant-purchased equipment.

Some Tandberg models have built-in multipoint conferencing software, which is unnecessary. This software places significant bandwidth loads on the county initiating the multi-way call, and MNET provides multi-call services as part of its standard package to all counties.

Document cameras (desktop visualizers) can cost $3,000 to $4,000 and are unnecessary and often unused. Most room system cameras adequately capture images of flat and 3-D objects if stands or easels are properly positioned to support this occasional need. In addition, the Natural Presenter Package displays high-quality views of PC-based files and images.

D. Annual maintenance contract.

Generally, the first year of hardware and software maintenance is covered under warranty. A maintenance contract is strongly recommended but not required; however, current video system operating software must kept current with MNET standards.

The maintenance contract covers software fixes and upgrades and one-day advance parts replacement (replacements are shipped in advance of the defective component's return). Vendors may also provide on-site maintenance at various service levels, such as 24/7. Typical maintenance contracts range from $700 to $1,700 or more annually. Video sites without a maintenance contract will have to pay time and materials for repairs or possibly replace a whole unit at full cost.

III. PC video conferencing software and equipment

The Tandberg Movi is the recommended software package for PC video conferencing. Movi's desktop software is free, but a Tandberg Video Communications Server (VCS) and licenses to support a certain number of simultaneous calls must be purchased. The VSC equipment and licensing have both a one-time and annual maintenance charge. The Tandberg VCS equipment can also provide the video gateway feature to enable PC video systems to connect to H.323 end-points and multi-site bridging equipment. At this time, regions or individual counties selecting this option should coordinate these purchases through the State HSEM office to leverage investments.

Many relatively inexpensive PC/laptop web cameras are available. However, it may be worth purchasing a higher-quality camera in the $100 to $300 range. These cameras are high-definition capable, have better low-light capability, have limited digital pan/tilt/zoom features, and can ensure better quality video transmission via a built-in digital signal processing. [12] Microsoft and Logitech offer several HD capable models which perform well. The TANDBERG PrecisionHD™ USB Camera is specifically designed to work directly with the Movi software application and is a recommended choice.

Connecting a laptop to another entity's network may cause firewall/security problems, so users must ensure that a laptop solution will be viable choice outside their own network. Additionally, ensure that the EOC has a sufficient number of PCs during a 24/7 operation if one is dedicated for video conferencing.

IV. Use of equipment

A. Rules of use and qualifications for use.

The video conferencing system should be regularly and routinely available for scheduled and ad hoc non-emergency meetings as well as for its primary use during emergencies.

The EOC's activation and deactivation plan should consider video equipment set-up within 24 hours, if the system is not within the EOC. Each emergency manager should have a plan and process for using the equipment during an emergency, including invoking emergency use of the system if needed.

Multi-site video conferencing events must be scheduled through OET's reservations software or center unless the equipment is not connected to MNET. OET will provide new users with written instructions for contacting the correct OET personnel and reservations center. Point-to-point calls (one site to another) do not require an OET reservation. OET's online reservation system is available 24/7 to schedule unplanned video calls, if necessary. OET's Technical Assistance

[12] Digital signal processing is shifted to the PC and provides faster, higher quality real-time transmission.

Center is staffed 24/7, too. Sites not connected directly to MNET should make arrangements for connecting as off-net locations to the state infrastructure for multi-site conferences.

B. Priority of use

To maximize the benefits of public investments, the State/County Collaboration Program guidelines request that all county video conference rooms be scheduled on a first-come, first served basis. Scheduled video events should not be bumped for non-emergency purposes. However, emergency management programs will have first priority use during an emergency event and pre-empt any scheduled event.

C. Availability to other public safety disciplines and other government functions

The State/County Collaboration Program requests that video conferencing equipment be available to other county departments and state agencies participating in the program. However, some emergency management programs limit EOC access during non-emergency status, making video systems in EOCs unavailable for general use.

The equipment should be available to other public safety disciplines and entities, such as regional radio boards, regional committees, law enforcement, fire, and first responders to the greatest degree possible.

D. Public meeting law requirements

Regional radio boards, joint-powers organizations, and other public bodies holding open-meetings via video conference must have: 1) one member and video conference equipment located at the public body's regular meeting location; 2) public access to any other member's location and video conference equipment; and 3) the ability to see any public member when he or she is talking or voting.[13]

[13] Minnesota Statutes 13D.02: https://www.revisor.mn.gov/statutes/?id=13D.02

Network Connection Standards

Video network infrastructure such as multi-point control units (MCUs) or "bridges" are required to support three or more way connections and can handle well over 100 sites simultaneously in certain emergency situations. Additionally, network "gatekeeper" devices register sites, process calls, and manage the overall dialing plan for the emergency management video network. Network "gateways" convert signaling data from sites with different transmission and address protocols. These devices and other network infrastructure equipment are expensive and require ongoing technical and operational support. Regional grant requests should have clear plans for the shared or pooled use and coordinated operations of these network components if included in regional plans.

I. Required use of MNET

Grant-funded video conferencing equipment must be connected to Minnesota's Network for Enterprise Telecommunications (MNET). Nearly all state, county, courts, and public higher-education video-conferencing sites connect through MNET today. A significant advantage is MNET's system redundancy that prevents call failure. Multiple conference bridge and gateway devices provide backup systems if one should fail. Shared end-point management and scheduling systems ensure access and performance.

The state's Office of Enterprise Technology (OET) operates MNET and offers these video-conferencing services:

1. Provide and maintain the network resources to support video conferencing calls.
2. Provide each site with an E.164 (dialing) number.
3. Maintain a "white pages" listing of available video conference sites.
4. Provide Quality of Service (see Standard IV below).
5. Monitor and report on the service.
6. Operate the OET Service Desk 24/7 to support video connections and manage network outages and requests.
7. Operate a video conference reservation center and online system to schedule and support video calls.
8. Perform inter-operability testing and certification of video conference sites.
9. Perform initial testing and acceptance of video conference site connections.
10. Maintain a current list of technical staff contact information.
11. Maintain contracts and vendor relationships with video conference equipment providers.
12. Maintain contracts, connections and vendor relationships with video conference network and service providers to enable world-wide connectivity.
13. Recommend standards for rooms and equipment.
14. Develop and provide training for host site coordinators and participants.
15. Arrange for off-network and out-of-state video calls.

Adding an emergency-management video conference site does not necessarily increase the county's monthly MNET video subscription fees. The State/County Collaboration Program allows county governments, state offices, and higher education institutions to share bandwidth. The collaborative allows a county to have up to five MNET video conferencing sites for a fixed monthly fee with unlimited video calling (no time-based charges or "minutes").[14]

However, a county must have sufficient MNET network access bandwidth capacity to support multiple simultaneous video calls along with the county's secure data, Internet and voice transmissions. Many counties' bandwidth cannot support as many as five simultaneous video calls, so additional capacity is necessary. County program and technical staff can devise a local means to share and prioritize the limited amount of bandwidth among all county divisions or jointly fund additional capacity if needed. (see Standard V below). Additional bandwidth cost depends on county-specific network factors.

OET has a number of technical standards or protocols for MNET video sites. OET can provide technical assistance and more detailed information at the time of end-point equipment installation and certification to MNET. The protocols cover end-point equipment connection to the local area network (LAN) and LAN and firewall configurations and capacities. Purchasing end-point equipment from state contracts and placing work orders with OET for additional video connections ensures the best interoperability on MNET.

II. End-point equipment connection

All emergency management group or room video conferencing systems are connected to a managed Internet Protocol network whenever possible. On a limited basis, MNET supports connections via the public Internet or via an Integrated Service Delivery Network (ISDN) public telephone line, but these connections are only deployed if no other option exists. This standard does not prevent using cellular aircard technology to connect mobile equipment.

III. Situations requiring integration of regional network infrastructure (gateways, bridges)

An emergency management region or large county with its own network equipment may not find it cost-effective to connect all end-points to MNET. The decision to not use MNET as the primary IP network connection depends on previous technology investments and frequency of calls outside one's own network. Such regions or counties are strongly encouraged to make arrangements with OET to "dial into" MNET and share network resources with the larger public safety community.

[14] http://www.mnet.state.mn.us/video/video-conferencing/collaboration.php

IV. Quality of Service

Quality of Service (QoS) allows a network provider to prioritize different types of traffic. Video conference calls require unbroken, real-time video and audio transmission. Quality of Service ensures that video calls have sufficient bandwidth and performance to prevent even the smallest transmission delays from interrupting communication. Quality of Service is a required aspect of a county's bandwidth management plan for both the Local Area Network (LAN) within a county building and the Wide Area Network (WAN) connection used to communicate to other jurisdictions.

Quality of Service is not applicable to web/net conferencing or PC video conferencing. A county deploying PC video conferencing must configure its network firewall rules to enable these communications beyond the county LAN.

V. County bandwidth management plan

A county bandwidth management plan is critical to managing the total number of simultaneous video calls happening. The State/County Collaboration Program requires that capacity for data traffic remains available at all times. County emergency managers should work with their IT department and OET to determine how to support additional video end-points with QoS bandwidth. Additionally, the plan should look at PC video and Web/Net conference bandwidth needs if these technologies are used.

A bandwidth plan prioritizes network traffic and allocates bandwidth to minimize delays for all data, voice, and video applications. The plan specifies tools and techniques to prevent data, voice, and video traffic from exceeding the network's capacity and decreasing performance. Counties installing an emergency management video conferencing system must ensure that emergency video calls have high priority and mitigate potential network blockages.

A bandwidth management plan addresses these questions when a video site is added:

1. How many simultaneous video calls can the network support and still have capacity for voice and data traffic?
2. How does technical staff ensure the maximum capacity is not exceeded?
3. Are video calls identified as high priority network traffic?

VI. PC conferencing server

Video conferencing via PC and laptops requires a Session Initiation Protocol (SIP) server to connect the calls and ensure interoperability with group (room) video conferencing equipment. A shared network server provides the call registration and management functions, as well as translating PC video calls to video conferencing system protocols. Grant requests for SIP servers and H.323 gateway components should pool, share and coordinate these video network infrastructure resources through HSEM and be vetted against the Federal Department of Homeland Security's authorized eligible equipment list.

Room (video site) Recommendations

These recommendations apply to the rooms that house the video conference systems and calls. They are not standards due to county-by-county variation in EOC size and network design.

I. Wiring – access to networks

The EOC should have a dedicated, color-coded network jack for the video conferencing equipment, especially if the video system is not regularly based in the EOC. A color-coded jack easily identifies where to connect the video conferencing equipment. A jack label is an alternative but must be attached so it cannot fall off or be easily removed. An Ethernet jack and secure QoS LAN connection to the State WAN demarcation equipment are recommended.

II. Network security

Each video system has user-activated encryption capability. Additionally, WAN security protocols prevent unauthorized entry (hacking) into the statewide network.

III. Event security

Ideally, the video system should be in a separate room for controlling information dissemination and to minimize background sound and visual distractions. Not all county EOCs have sufficient space, however. It is important to restrict room access to ensure that a video call's participants are authorized to hear and see confidential information.

IV. Securing the equipment

Locking or storing the video system in a closet will reduce scheduled, non-emergency use, and is not recommended.

Staffing Standards

These standards concern the roles, training, and competencies for non-technical and technical staff that use and support the video conferencing system. If possible, organizations should designate primary and backup staff for the skilled users and technical staff roles. In small counties, other departments' or state court staff who are already familiar with video equipment and OET video processes can be back-ups.

Successfully installing and using video-conference equipment requires clearly designated roles and responsibilities. Emergency managers, skilled users, and technical staff should have good working relationships to ensure the equipment is ready for emergency purposes.

I. Three levels of roles and training

A. End-user/participants – End users are the video-call participants. The emergency manager and at least one participant should be familiar with the video equipment to operate the following:

1. Microphone mute button;
2. Camera zoom, tilt, and pan adjustments;
3. Volume control;
4. Video source selection, including main camera, digital or video recorder player, and computer; and
5. Outgoing audio levels and the proper placement of microphones.

Every emergency manager should know how to activate and use the video conference equipment and resolve common problems, such as echoing. Skilled users and technical staff may be unavailable on weekends and nights. The emergency manager should generally understand technical staff's network security, configuration, and bandwidth concerns with video conferencing system.

Other participants should know proper video-call etiquette:

1. Begin each video event with a roll call of participants, with the leader calling off counties alphabetically to ensure no one is talked over.
2. Identify yourself when talking.
3. Do not interrupt other speakers.
4. Minimize side conversations (or mute your audio).
5. Pause occasionally when asking for comments or feedback or when taking votes speaking because of slight transmission delays.
6. If audio is carried by telephone, know the steps to mute or put the call on hold so that your phone system's background music will not play.

B. Skilled users (equipment and site contact) – Non-technical skilled users are proficient with the equipment's operation and are up-to-date with OET's administrative procedures and policies. They are a liaison to technical staff, and assist end-users to schedule and participate in a video conferencing session. They should be on call to assist in the initial connection and during scheduled video

sessions, but not necessarily in the room at all times. Skilled users should receive training to perform these functions:

1. Be generally familiar with the site and ensure room arrangements support an event (good lighting, minimal noise echo, etc);
2. Handle any requests for special equipment or configurations;
3. Handle any site-related requests from participants;
4. Train participants as necessary in handling the video end-point remote control during events and to operate video and other equipment (digital recorders, laptop or PC, etc.);
5. Assist as needed to handle any issues that arise during the event;
6. Assist in the pre-event setup and testing and the post-event teardown;
7. Be up-to-date with the OET's administrative policies and procedures for video operations, including billing and event scheduling; and
8. Be able to follow OET Service Desk staff's directions over the telephone and assist with problem diagnosis and correction efforts.

C. Technical staff – have the technical knowledge to understand the equipment and network infrastructure to operate the systems efficiently. They must understand the bandwidth requirements to support video conferencing and how to ensure and manage "quality of service" during events. They are not expected to be proficient video equipment users. Technical staff should receive training to:

1. Be generally familiar with data networking and audio/visual equipment;
2. Be familiar with the site's specific network equipment and configuration;
3. Be familiar with the specific systems used at the site;
4. Notify OET of any changes to room or equipments configuration;
5. Be up-to-date on OET's technical policies, procedures, and best practices;
6. Follow OET's standard install process for the site;
7. Test and maintain equipment in conjunction with OET staff and troubleshoot problems;
8. Coordinate with suppliers the installation, repair, and replacement of equipment;
9. Be able to follow OET Service Desk staff's directions over the telephone and assist with problem diagnosis and correction efforts; and
10. Manage software assurances (maintenance plans).

Technical staff should be familiar with emergency management's business requirements during non-emergency use and EOC operations.

D. Training roles and responsibilities

The state HSEM, OET, video equipment vendor, and county staff have different training roles and responsibilities for initial/one-time and ongoing training.

Homeland Security and Emergency Management: Establish policies and procedures for using the equipment during emergency situations and provide initial and ongoing training to emergency managers and staff. The State EOC will also serve as "event host" when scheduling regional and statewide video calls.

OET: Provide initial/one-time training to skilled users and technical staff for understanding and following policies and procedures for successful equipment installation, certification to the network, and scheduling and participating in video conference sessions. Ad hoc problem resolution and troubleshooting provide opportunities for informal training.

Equipment vendor: Provide initial training to technical staff on equipment set-up, maintenance, and simple parts replacement. Train skilled users to operate all features and functions and troubleshoot common problems.

The vendor should host region-wide training for all emergency managers at the same time, via a video conference call. A tabletop exercise should be included and other department staff invited to expand the training.

County: A train-the-trainer model is recommended. Skilled users should provide initial and ongoing training to the emergency manager/lead participant on how to use the remote control to adjust video and audio functions and to correct video or audio problems. The lead participant should understand how to mute the sound, adjust the camera angle (zoom, tilt, and pan) for best picture, and use peripheral equipment. Skilled users should train participants on proper etiquette for video calls. Like most technology introduction and adoption processes, skilled staff support local users as they become familiar with using the technology will help maximize its use and benefits.

II. Local support

Skilled users provide the first level of support and can resolve many common problems and help with equipment activation. During a video call, other sites' lead users can provide assistance (walk staff through the steps) via video if they have problems using the remote or controlling the audio.

Each video unit should have a quick-reference guide or "cheat sheet" with the basic steps for activating the unit, calling into a conference, and resolving common problems. Appendix B has a sample guide.

The equipment's annual maintenance plan should include 24/7 emergency repair service and next-day parts replacement. Emergency managers should have alternative emergency-service arrangements if they do not purchase an annual plan.

III. Installation

Vendors do not need to train technical staff on installing the equipment. Technical staff should watch the vendor install the system to ensure there are no problems or shortcuts. The vendor should test the system and peripherals with county staff before leaving the site. Technical staff should know how to replace parts (cables, cameras, etc). The same vendor should install all of a region's equipment.

Technical Definitions

Bandwidth is a measure of available network capacity for transmitting voice, video and data. A video conference call requires 300-500 kilobits per second (kbps) of bandwidth per call, which equals up to 25 percent of some counties' connection capacity. A county network connection must have sufficient capacity to support video calls and all other voice and data uses simultaneously.

E.164 number is an International Telecommunications Union (ITU) standard that defines the international public telecommunication numbering plan used for telephones connected to the public switched telephone network (PSTN). State IP network (see MNET below) uses E.164 numbers for H.323 video conferencing end-points. An E.164 number is a regular ten-digit telephone number with a three-digit area code and seven-digit station number.

End-point equipment is a room-based video conferencing system that provides real-time, two-way video, and audio communication. Central to end-point equipment is a video codec (see definition below). Also included are video cameras, monitors, microphones and speakers. End-point equipment is also called ITV (interactive video) equipment. End-point equipment falls into two general categories – group video conferencing or personal video conferencing systems (see below).

Group video conferencing systems consist of audio and video components designed to better support participation of two or more people at a local site. The video codec supports multiple audio and video inputs/outputs along with the network connection. One or more video displays of 27" or greater along with one or more video cameras with pan-tilt-zoom controls, capability for setting camera pre-set positions, inputs for document cameras, digital video disc (DVD) and/or personal computer (PC) screen inputs support the video subsystem. The audio subsystem consists of one or more microphones capable of picking-up voices throughout the room, speakers that amplify incoming audio, an audio mixer that mixes microphone inputs along with other audio sources such as a DVD or PC into the transmission signal and an echo cancellation function that prevents incoming audio from a remote site being fed back into the local microphones and re-transmitted back to the remote site as an "echo."

H.323 Standards are a set of International Telecommunications Union (ITU) protocol and standards that ensure interoperability of IP video conference codecs and network equipment across manufacturers of this category communications equipment.

Minnesota's Network for Enterprise Telecommunications (MNET) is a public-private partnership delivering a statewide voice, video and data network for education, local governments, and state agencies. Nearly all state, county, courts and public higher-education video-conferencing sites connect through MNET.[15] The state's Office of Enterprise Technology (OET) operates MNET per State statute as a shared resource for the Minnesota's public sector using leased line connections from telecomm providers.

[15] MNET home page: http://www.mnet.state.mn.us/index.php and network map: http://www.mnet.state.mn.us/data-net/general/maps.php.

PC Video Conferencing is another real-time, two-way interactive communications capability that uses a PC's processing power, application software and audio/video PC peripherals to video conference between similarly equipped PCs connected to a common IP network, such as the Internet. A low-cost option for certain types of real-time communications; popular software applications for PC conferencing generally do not use all the same standards and protocols as H.323 video conferencing and will not interoperate directly without additional video network protocol translation equipment known as video gateways. Unlike H.323 video conferencing, PC video conferencing uses session initiation protocol (SIP) to establish connections. PC video conferencing software requires users to log into a compatible network-based SIP server to "dial" another site. Internet instant messaging sites use SIP based servers and most support audio and video connections. PC video conferencing typically does not have QoS protocols supporting connections and performance, especially in a full screen mode, can be varied.

Personal video conferencing systems typically consist of a single 8" to 17" monitor with a built-in video codec, built-in microphone, built-in speaker and a simple stationary, single-focal length video camera (no mechanical pan, tilt or zoom function). These systems generally support only one additional video input – typically from a PC. A head-set jack is typically available which switches the microphone and speaker function to a head-set with an ear-piece and microphone similar to those used for hands-free telephone or cellular phones. Many personal conferencing systems can also serve as a PC monitor when not in a video call. The video codec requires a separate Ethernet network connection from the desktop's connection.

Quality of Service (QoS) is a capability of IP network connections that ensures consistent performance of real-time voice and video transmissions over the network and prevents disruption by bursts of data communications such as Internet traffic.

Video Codec (coder-decoder) is a communications device or appliance that translates, combines and compresses audio, video and data information into a communications signal (coding) for transmission across an Internet Protocol (IP) network connection. A codec at the other end of the connection then decodes the signal back into audio, video and data information.

Video Conferencing is a real-time, two-way interactive communications capability that shares voice and video information from two or more locations (sites) across a common communications infrastructure. Video conferencing enables face-to-face communications among people separated by distance. In a video conference, each participating location is equally able to be seen and heard by all other sites in the conference, which is referred to as "virtual presence."

Video Event is a meeting held via video-conferencing.

Video Network Infrastructure consists of ITU compliant video components to support various functions necessary within a video conferencing network. Components are:

1. Directory gatekeepers provide end-point registration within a common dialing plan and are used to establish calls, manage bandwidth and, in conjunction with IP network hardware (routers and switches), support requests for QoS connections between end-points across a common managed IP network.
2. Multipoint Control Units (MCUs) provide conference bridging of three or more sites into a single video event and can also support audio-only connections from telephones.
3. Video gateways manage communications between different network types (ISDN vs. IP), dialing plans (including QoS hand-off between networks), network protocols (SIP vs. H323), security firewalls and other elements.
4. Video management systems support the monitoring and management of all video components on a common network along with the scheduling (resource reservation) and automated conference set-up of video infrastructure such as conference bridges and/or gateways.
5. Video content components support the translation of a video conference event into one-way audio/video streaming signals that are recorded and/or distributed simultaneously across an internet connection to PCs using an internet browser plug-in (such as Microsoft Media Player, Real Media Player, Apple QuickTime or Adobe Flash).

Web or Net conferencing is a real-time, two-way interactive audio and visual communication method using a specific manufacturer's software application on a PC, a telephone or voice over IP (VoIP) application on a PC and Software as a Service (SaaS) provider. Web conferencing technology differs from video-conferencing in that the primary visual element is a shared view of a PC screen. Central to most web conferencing is the ability to share the view and control of the presenter's PC applications. Interactive pointer and annotation tools are typically available to all participants. PC "web cams" can be incorporated into a shared conference view but are typically a small visual component and are a lower quality video transmission. Cisco WebEx, Microsoft Live Meeting, Adobe Connect and Citrix Go-to-Meeting are popular applications offered as a Software as a Service (SaaS) and require registration with the provider's network servers.

Initial and Ongoing Costs

Like other technical equipment, room-based video conferencing systems require an initial investment and ongoing costs. The following information provides general cost ranges.[16] A county's actual experience may differ.

Initial costs

Desktop, office, and meeting-room video conferencing systems offer the same features and functionality. The basic difference is how many people can easily participate in a video session, which directly relates to the unit's screen size. Costs vary, too, from $7,000 to $13,000 for the video unit. Plasma TVs, carts, document cameras, wireless microphones and other equipment can add thousands more. PolyCom equipment is generally less expensive than Tandberg products, which are recommended for emergency management programs.

Desktop units cost approximately $8,600 to $10,000 with a 15- or 17-inch screen, presenter\split screen functionality, and carrying case. Office and meeting-room systems cost approximately $11,000 to $14,000, depending on screen size (40 to 52 inches) and number (one or two), and including presenter functionality and cart. On-site vendor installation costs $600 to $700 per system.

Ongoing costs

Vendors offer optional maintenance plans from $700 to $1,700 annually, depending on the system's price. The plans cover software fixes and upgrades and one-day advance parts replacement.

The State-County Collaboration Program (SCCP) allows each county government to have up to five video conferencing sites at the same physical address (court house or government center, for example) without additional cost. A sixth site at the same building adds $25 per month for the E.164 dialing number. The charge is $160 per month if a video conference system is installed at a different physical address.

Video conferencing calls require significant bandwidth or network capacity. Counties may have to purchase additional bandwidth to support another video conference site or restrict the number of simultaneous video calls. Bandwidth costs vary by county depending on the number of existing video sites, local network capacity, and distance to network routers and hubs. The county IT department should determine available capacity for a new video site.

Multiple options exist to acquire additional bandwidth. The typical cost to increase bandwidth to the next capacity level is approximately $300 per month. The bandwidth and costs can be shared among many county programs.

[16] Equipment and maintenance costs are derived from recently expired State of Minnesota Tandberg and Polycom contracts and regions 2 and 6 video-system invoices. Bandwidth and video site monthly network charges are from OET's 2010 rates.

Appendices

A: Video Conference Site Inventory and Ratings by County

Rating	Description
A	Video Conferencing Technology (VCT) is in the Emergency Operations Center (EOC) or in a room next door.
B	VCT is in the same building or block as EOC and can be moved to the EOC.
C	VCT is in same building or block but cannot be moved.
D	No viable VCT site (usually .2 miles or farther from EOC).

Counties are grouped by HSEM region.

County	County seat	EOC location	Rating	MNET site name	Owner	Notes	Other available sites near EOC	County Emergency Manager's comment
Blue Earth	Mankato	County Justice Center, 401 Carver Road	B	co-blueearth r 5 jail mankato	County	Emergency use only; 17-inch screen.	Two court-owned sites in same building.	No concerns. IT staff say port is needed in EOC.
Dodge	Mantor-ville	Courthouse, 22 E. 6th Street	B	zayo-scha dodge mantorville	County public health alliance	Site is in same building as EOC. Equipment may be moved to Dodge City, 8 miles away.	One court site in same building.	Equipment is available on a restricted basis. Limited room in EOC (county dispatch center).
Faribault	Blue Earth	Sheriff's Office, 125 W. 2nd St.	D			New EOC has the wiring but no video equipment.		Confirmed that neither EOC or LEC has the equipment.
Fillmore	Preston	County Office Building, 902 Houston St. NW	D			EOC is .6 miles from Courthouse sites.		Neither EOC or LEC has the equipment. Bandwidth is 3 mg but shared with 70+ computers, which may be an issue.
Freeborn	Albert Lea	Gov't Center, 411 S. Broadway	B	zayo-scha freeborn albert lea	County public health alliance		One court site in same building.	No concerns but must be easy to set-up and use.
Goodhue	Red Wing	LEC, 430 W. 6th Street	B	co-goodhue c 2 redwing	Courts	Site is in a building next door to LEC. Emergency use only.	Two county sites in nearby buildings.	Equipment is in another building so people would need to leave the EOC.
Houston	Caledonia	Courthouse, 304 S. Marshall Street	B	co-houston r caledonia	Courts	New EOC by spring 2011, possibly with VCT.		Prefers equipment permanently located in EOC so no conflicts over priority. County is upgrading bandwidth.
Le Sueur	Le Center	Courthouse, 88 S. Park Ave.	A	co-lesueur r 1 human svs lecenter	County human services	Site is a room next door to EOC.	One court site in same building.	No concerns raised.
Mower	Austin	County Service Center, 201 - 1st Street NE	B	co-mower r austin	County	Site is in same building as EOC.		No concerns raised.
Nicollet	St. Peter	Gov't Center 501 S.	A	co-nicollet r stpeter	County	Site is the room designated as the EOC.	One court site in same building.	Prefers equipment located in another room during EOC event.
Olmsted	Rochester	Airport Fire Sta./County EM, 7300 Brataas Dr.	D			EOC is 8 miles from Government Center.		Confirmed that EOC does not have the equipment.
Rice	Faribault	LEC, 118 NW 3rd Street	B	co-rice r gsc 3a faribault or co-rice r social services faribault	County	Sites are in the same block as EOC.	Three court sites in same block.	Concern about accessing the equipment. IT staff say two units are portable but the EOC needs a port.
Steele	Owatonna	Fire station, 107 W. Main Street	D			EOC is 1 mile from Government Center sites.		Confirmed that neither EOC or LEC has the equipment.
Wabasha	Wabasha	Courthouse, 848 - 17th St. E	B	co-wabasha r training wabasha	Courts	Site is in same building as EOC.	One court site in same building, not moveable.	Has not seen the equipment, but believes it will suffice.
Waseca	Waseca	Courthouse, 307 N. State Street	B	co-waseca c waseca	Courts	Site is in same building as EOC.		Ensure proper training before emergency use, dedicate bandwidth to EOC and determine priority among users. The EOC should have its own VTC system for emergency
Winona	Winona	LEC, 201 W. 3rd Street	B	Two new portable units to be listed with OET.	County	Portables are within a block of the EOC.	Three court sites in same building; another county site on same block. None are moveable.	Prefers equipment permanently located in EOC so no conflicts over priority, is ready to be used, and to become familiar using it.

County	County seat	EOC location	Rating	MNET site name	Owner	Notes	Other available sites near EOC	County Emergency Manager's comment
Aitkin	Aitkin	Courthouse, 217 2nd Street NW	A	Not on MNET	County-EOC		One court site in building next door.	Did not contact.
Carlton	Carlton	Sheriff's Office, 317 Walnut Ave.	A	Not on MNET	County-EOC		One county site in building next door.	Did not contact.
Cass	Walker	Courthouse, 300 Minnesota Ave.	A	Not on MNET	County-EOC		One court site in same building.	Did not contact.
Cook	Grand Marais	LEC, 143 Gunflint Trail	A	Not on MNET	County-EOC			Did not contact.
Crow Wing	Brainerd	Historic Courthouse, 326 Laurel	A	Not on MNET	County-EOC		One county site in same building.	Did not contact.
Itasca	Grand Rapids	Courthouse, 123 4th Street NE	A	Not on MNET	County-EOC		One court site in same building.	Did not contact.
Kanabec	Mora	Courthouse, 18 North Vine Street	A	Not on MNET	County-EOC		One court site and one county site in same building.	Did not contact.
Kooch-iching	Int'l Falls	Courthouse, 715 4th Street	A	Not on MNET	County-EOC		One court site in same building.	Did not contact.
Lake	Two Harbors	LEC, 613 3rd Avenue	A	Not on MNET	County-EOC		One county site in building next door.	Did not contact.
Pine	Pine City	Courthouse, 635 Northridge Drive NW	A	co-pine r ems homeland security	County-EOC	Site is on MNET.	One court site and one county site in same building.	Did not contact.
St. Louis	Duluth	EM, 5735 Old Miller Trnk Hwy	A	co-stlouis EOC duluth	County-EOC	Site is on MNET.		Did not contact.
Becker	Detroit Lakes	Courthouse, 915 Lake Ave, Lower Level	B	co-becker c court detroitlakes	Courts	Site is in same building. Emergency use only.	County human services site .25 miles away.	No response received.
Beltrami	Bemidji	LEC, 613 Minnesota Ave NW, main floor	C	co-beltrami r 2 county bemidji or co-beltrami r 3 admin bemidji	County	Emergency use only. Both sites are in different buildings on same block as EOC.	Three court sites across the street from the EOC.	Prefers equipment permanently located in EOC; existing sites are in other buildings, cannot be moved, and are hard to schedule.
Clay	Moorhead	LEC, 915 9th Ave. N, basement training room	B	co-clay p 3 moorhead	County	Site is .2 miles away, but moveable.	Another county site and a court site within .2 miles.	Prefers equipment permanently located in EOC as existing sites are hard to schedule. Unable to move VCT if building is diked.
Clear-water	Bagley	LEC, 213 main Ave N, Lower level	C	co-clearwater r commissioner conf bagley	County	Site is in same building as EOC.	One court site in same building.	No response received.
Hubbard	Park Rapids	LEC, 301 Court Ave, Lower level	A	co-hubbard r 1 soc svs	County social	Same floor as EOC.	One court site in same building.	No response received.
Kittson	Hallock	Courthouse, 410 S. 5th St.,second floor mtg room	C	co-kittson c hallock	Courts	Site is in same building as EOC.		No concerns unless it is a court day. VCT is upstairs and not in the EOC.
Lake of the Woods	Baudette	Gov't. Center, 206 8th Ave SE, Board Room	A	co-lakeofthewoods r 1 county baudette	County	Site is in the EOC-designated room and is heavily scheduled for non-emergency use.	One court site in same building.	Likely a problem if more than one video conference at the same time.
Mahno-men	Mahno-men	Courthouse, 311 N Main St., Basement	B	co-mahnomen p hs mahnomen	County human services	Site is in same building as EOC.	One court site in same building.	No response received.
Marshall	Warren	Courthouse, 208 E. Colviert, Room in SO	B	co-marshall r social services warren	County	Emergency use only, but other site can be scheduled.	Another county site in same building.	No concerns raised.
Norman	Ada	Emergency manager's vehicle.	C	co-norman r ss ada	County social services	Site is in same building as Sheriff's Office.	One court site in same block as social services.	Rating should be a C due to non-portability (was originally a B).
Penning-ton	Thief River	LEC, 101 Main Ave, Lower level	C	co-pennington r trf	Courts	EOC is across the street from courthouse.		The court system is not accessible to county personnel.
Polk	Crookston	LEC, 600 Bruce Street	D			Nearest site is county justice center, .5 miles from EOC.		Confirmed that neither EOC or LEC has the equipment.
Red Lake	Red Lake Falls	Red Lake Falls Fire Hall 108 2nd St. SW	C	co-redlake r 1 redlakefalls	Courts	Site is in same block as EOC.	Social services site, but it is not connected to the state's MNET.	Court room is not set up as EOC and may be unavailable during hearings.
Roseau	Roseau	Courthouse, 606 5th Ave SW, Community Trng Rm	B	co-roseau 1 social services roseau	County social services	Site is in the same block, but moveable.	One court site in same building.	Does not agree with B rating. The Social Services equipment is not moveable. EOC does not have the space for VCT and network cannot handle more than two video calls at once.

County	County seat	EOC location	Rating	MNET site name	Owner	Notes	Other available sites near EOC	County Emergency Manager's comment
Benton	Foley	County SO 581 Hwy. 23	B	Portable unit.	County	To be connected to state's MNET.	One court site in building next door.	No concerns. IT staff say port is needed in EOC.
Big Stone	Ortonville	County Highway Dept., 437 Minnesota St N.	D			Nearest site is .75 miles from EOC.		EOC is not set up to use the equipment.
Douglas	Alexan-dria	Douglas Co LEC 216 7th Ave W	C	co-douglas r social svcs alexandria	County social services	Site is in same building as EOC. Emergency use only.	One in courthouse, but room is heavily used.	No concerns raised.
Grant	Elbow Lake	County Social Services, 28 Central Ave. S.	D			Nearest site is .4 miles from EOC.		No concerns other than courts being in session.
Kandiyohi	Willmar	County Em. Mgmt, 2201 NE 23rd. St.	A	co-kandiyohi r eoc willmar	County-EOC		Human services site next door.	No concerns raised.
Meeker	Litchfield	Courthouse, 325 Sibley Ave	B	co-meeker c 2 litchfield	Courts	Site is in same building as EOC.		No response received.
Mille Lacs	Milaca	County SO 640 3rd St SE	B	co-millelacs c milaca	Courts	New LEC and Courthouse will be connected by tunnel in	County social services site in same block.	Equipment is "far away" for an emergency. Prefers VCT located in new EOC.
Morrison	Little Falls	Gov't Center, 213 1st Ave SE, Meeting Rm #1	C	zayo-scha morrison littlefalls	County public health alliance	Site is in annex building (Social Services Dept) next door to EOC.	One court site in same building as EOC.	Room will not work well for meetings or EOC event.
Otter Tail	Fergus Falls	Ottertail City	D			EOC is 30 miles from Fergus Falls. IT staff are considering VCT options. Also a budget issue.		Confirmed that EOC does not have the equipment.
Pope	Glenwood	Courthouse, 130 E Minnesota	B	co-pope r public health glenwood	County public health	Site is across the street from EOC.	Court site in same building.	Could work but courtroom is not good for EOC event.
Stearns	St. Cloud	County LEC 807 Courthouse Square, Rm 071A	C	co-stearns r 1 stcloud	County human services		Four court sites in same block, but are located in a secure area and cell phones are prohibited.	Prefers equipment located in EOC due to access issues to courts' equipment.
Stevens	Morris	Stevens Co LEC 400 Colorado Avenue	D			New LEC will be completed in spring 2011 and will have VCT, but looking for funding.	Court site is inaccessible during construction.	Willing to use other county equipment farther away, but would like the equipment in new EOC.
Swift	Benson	County LEC 301 14th St No., Lower level	C	co-swift c 2 8th judicial benson	Courts	Site is in same building as EOC. Emergency use only.	A county human services site is 1 mile away for non-emergency use.	No concerns raised.
Todd	Long Prairie	212 2nd Ave. S.	B	Portable unit (to be connected to MNET).	County		County public health site and court site next door.	No concerns raised.
Traverse	Wheaton	Courthouse Annex, 202 8th Street N	A	co-traverse r 1 social svs wheaton	County social services	Site is the EOC-designated room.	One court site in building next door.	Need advanced notice for scheduling. No back-up power in Courthouse or annex.
Wadena	Wadena	Courthouse, Lower Level, 415 S. Jefferson	B	co-wadena c 7th wadena	Courts		A county site is .3 miles away.	No concerns raised.
Wilkin	Brecken-ridge	Breckenridge City Hall, 420 Nebraska Ave.	D			Only court site is .3 miles from EOC.		No concerns using court equipment.
Wright	Buffalo	County SO, 3800 Braddock Ave. NE	D			Nearest county and court sites are 2 miles away.	None near primary EOC. Nuclear EOC is located at county gov't center, next to a VCT room.	Confirmed that neither primary EOC nor LEC has the equipment.

County	County seat	EOC location	Rating	MNET site name	Owner	Notes	Other available sites near EOC	County Emergency Manager's comment
Brown	New Ulm	LEC Basement, 15 S	B	co-brown p 1 lec newulm	County-LEC	Same building as EOC.	One court site on same block.	No concerns. Prefers using MNET for video conferencing.
Chippewa	Monte-video	Courthouse Assembly Room, 629 N 11th Str	B	co-chippewa r montevideo	Courts	Same building as EOC.	County hospital site is .2 miles away.	Does not agree with B rating. There will be times when the court equipment is needed but unavailable. The EOC is a better space and other agencies could use the VCT.
Cotton-wood	Windom	Cottonwood County SO 902 5th Ave	C	co-cottonwood c 2 windom	Courts	Site is 1.5 blocks away. Emergency use only.	Law library located in same building as EOC has a burnt-out VCT and is not connected to	Could work but not the best option, per former emergency manager.
Jackson	Jackson	LEC Basement 400 Sherman Str	B	co-jackson c b jackson	Courts	Same block as EOC.	County human services site on same block, but not on MNET.	Prefers funds for other EOC equipment instead. Courts may not allow VCT to be moved.
Lac qui Parle	Madison	LQP Annex 316 4th Str	A	To be installed in EOC.	County-EOC			No concerns raised.
Lincoln	Ivanhoe	Courthouse Basement, 319 N Rebecca	C	co-lincoln c ivanhoe	Courts	Site is in same building as EOC.		No response received.
Lyon	Marshall	LEC Basement, 611 W Main	A	Equipment never activated.	County-LEC	The equipment is in the EOC but was never activated (supposedly a cost issue).	One county site and two court sites next door to LEC.	Wants to know how the equipment can be set up and connected with the state.
Martin	Fairmont	County Courthouse, 201 Lake Ave	B	co-martin c 2 fairmont	Courts	Same building as EOC.	County human services site on same block.	No concerns other than lack of space (15 people max.). Good and bad points to having VCT in EOC or next to it.
McLeod	Glencoe	Courthouse Basement, 830 E 11th Street	C	co-mcleod c 2 courts glencoe	Courts	Same building as EOC.	County social services site half-mile away.	Time consuming to move and reconnect VCT in EOC. Alternative is to go to court room. May have bandwidth problems if two calls at once.
Murray	Slayton	Government Center 2500 28th Street	B	co-murray r slayton	Courts	Site is in building next to EOC.		Does not agree with B rating. It would be difficult to move the VCT between buildings and courts may need to use it. No more than two calls at once.
Nobles	Worthing-ton	Government Center, Farmers Rm Basement 315 10th Street	C	co-nobles r 1 worthington	County	Same building as EOC.	LEC has a site, but is 2.3 miles away.	Does not agree with C rating (EM is fine using identified site). Prefers funding for other EOC equipment. Possible non-emergency scheduling conflicts.
Pipestone	Pipestone	Courthouse, Community Room 416 S Hiawatha	B	co-pipestone c 2 pipestone	Courts	Same building as EOC.	Another site is being added and will be located in a room used as part of the EOC.	No concerns raised.
Redwood	Redwood Falls	Public Health Meeting Room Highway 19	B	co-redwood r human svcs redwoodfalls	County human services	Site is a block and a half away but new equipment is portable.		Equipment is not in the same building as EOC. Steps in Gov't Building makes it hard to move.
Renville	Olivia	Gov't Services Bldg, 105 S 5th Str, RM 117	A	co-renville p olivia	County	The site is located in the EOC conference room.	Another county site in same building.	No concerns raised.
Rock	Luverne	LEC, 1000 N Blue Mound	C	co-luverne r ss rock	County social			No concerns raised.
Sibley	Gaylord	Courthouse Basement, 400 Court Ave	B	co-sibley c courtroom gaylord	Courts	Site is in same building as EOC.	Another court site in same building.	Can be used, but prefers equipment in basement in case of tornado. Scheduling may be a problem.
Waton-wan	St. James	Courthouse Basement, 715 2nd Ave S	B	co-watonwan c 3 courtroom b stjames	Courts	Site is down the hall from EOC.	Another court site in same building.	Believes rating should be a C because equipment cannot be moved, Courts may be using it and EM needs access to courts space. EOC doesn't have space for VCT.
Yellow Medicine	Granite Falls	LEC Training Room 930 4th Street	C	co-yellowmedicine r granitefalls	Courts	Site is in building next to EOC.		Not in EOC and couldn't use it during hearings. EOC has room for a portable.

County	County seat	EOC location	Rating	MNET site name	Owner	Notes	Other available sites near EOC	County Emergency Manager's comment
Anoka	Anoka	Government Center, 2100 Third Ave	A	Not on MNET	County-EOC		Two county and two court sites in same building.	Did not contact.
Carver	Chaska	Government Center, 600 E 4th St.	A	Not on MNET	County-EOC		Court site in building next door.	Did not contact.
Chisago	Center City	Government Center, 313 N. Main St.	A	Not on MNET	County-EOC		Three court sites in same building.	Did not contact.
Dakota	Hastings	LEC 1580 Hwy 55	A	Not on MNET	County-EOC		Two county and three court sites in building next door.	Did not contact.
Hennepin	Minne-apolis	Public Works, 1600 Prairie Dr. Medina	A	Not on MNET	County-EOC			Did not contact.
Isanti	Cam-bridge	Gov't Center, 555 18th Ave.	A	Not on MNET	County-EOC		Court site in same building.	Did not contact.
Ramsey	St. Paul	Public Works, 1425 Kirkwood Dr., Arden Hills	A	Not on MNET	County-EOC			Did not contact.
Scott	Shakopee	LEC, 301 Fuller St. So.	A	Not on MNET	County-EOC		One court site across the street.	Did not contact.
Sherburne	Elk River	Gov't Center, 13880 Hwy 10	A	Not on MNET	County-EOC		One county site and one court site in same	Did not contact.
Washing-ton	Stillwater	Gov't Center, 14949 62nd St.	A	co-washington r eoc stillwater	County-EOC	Site is on MNET.	One county and two court sites in same building.	Did not contact.

Appendix B: Sample Video Conferencing "Quick Reference" Guide (courtesy of Hennepin County)

Video Conferencing
Quick Reference Guide

These are the activities needed to successfully participate in a Video Conference Call.

Note: Allow for enough time when placing initial call – may want to reserve the room and show up 15 minutes early to ensure device is set up.

Device Name: **co-hennepin p hcgc a0542** Phone Number / IP Address: **6123738675**	Make / Model: **Tandberg** / **Samsung 42"** Tandberg Model: **95MPX**

HENNEPIN COUNTY
INFORMATION TECHNOLOGY

Equipment Preparation / "Waking up the System"		
What	**How**	**Notes**
Wake up the system	Pick up Tandberg remote	Typically, to "wake up the system" simply **pick up the Tandberg remote** and the equipment should be ready to go. Verify equipment is operating correctly (next step).
Verify equipment is operating	Image shown on Monitor	User will be able to see themselves on the monitor or an image of the room they are in. If you are unable to see yourself on the TV monitor, see Troubleshooting Guide for information on Plugging In Equipment and Turning On Equipment. **Note:** The telephone number of that device should appear in upper right hand corner.
Set up mics	Turn on mics and place around the room	1. Remove wireless microphones from base 2. Distribute microphones evenly around the room 3. Turn on each microphone individually - **flashing green light** indicates that microphone is on. Red light indicates microphone is off
Presentation	Attach computer to video equipment, if needed	If video conference will include a presentation (i.e., PowerPoint presentation or other documents you want to project to all participants), attach your laptop to the supplied cord. Select the 'Presentation' button on Tandberg remote Select the 'Layout' button on Tandberg remote if you want to split the screen with the presentation and the audience. **Note:** you may have to select Function option (i.e. FN 8 if Dell or FN 4 if HP) in order to display image from computer / laptop to the screen. Dual Video icon  will appear indicating that presentation and audience is showing (audience should be able to see presenter)
Starting the Call		
What	**How**	**Notes**
If you are **initiating** the call	1. Enter in the phone number or IP address 2. Select Green button on remote	Enter the phone number or IP address using the number keys on the Tandberg remote  **Note:** User can toggle back and forth between numeric and alpha via by pressing the # sign and holding After dialing the number, a "Call status" message will display "Calling". Connection will be made when the other party accepts the call.

If you are **answering** an incoming call	1. Select OK on the Tandberg remote 2. Activate microphones	"Call status" message will show "Incoming call" . 1. Press **OK** on the Tandberg remote. Call is connected. On some systems, the device is set up to automatically answer – others may need to select ok on remote in order to answer 2. Microphone will be off by default when user calls in.  (indicates mic is off). Press '**Mic**  **off'** on the Tandberg remote to active microphones
If looking for a phone number	Select the 'address' book on the Tandberg remote	The device may have preprogrammed numbers available – select  on the Tandberg remote. You can also store phone numbers by selecting this option

During the Call

What	How	Notes
During the call, you may need to make adjustments on volume, zoom in/out with the camera, etc. using the Tandberg Remote 		
Volume	Adjust the volume by using the remote	Use the Volume button on the Tandberg remote to adjust the volume and on the monitor remote if there is one. Indicates that the volume is off or all the way down 
Camera	Controlling the camera	User can adjust the camera to focus on one individual by zooming in to them or zooming out to show the whole room / group. ❖ The zoom option is listed on the right side of the Tandberg remote ❖ To adjust the angle of the camera, use the center button on the Tandberg remote to move the camera from side to side as well as up and down ❖ Camera will auto focus
Split screen	Select the Layout option on Tandberg remote	This allows you to have multiple visuals on screen – i.e. your audience and yourself as well as any presentation that you would like to show. 
Showing Word doc / Power Point	Select Presentation on the Tandberg remote	User must attach computer/laptop to the device (like you would set up a projector) ❖ Note: you may have to select Function option (i.e. FN 8 if Dell and FN 4 for HP) in order to display image from computer / laptop to the screen.

		❖ Dual Video icon  will appear indicating that presentation and audience is showing (audience should be able to see presenter using the Layout option – see above)
Selfview	Select 'Selfview' option on Tandberg remote	By selecting the Selfview it will display your outgoing video – press again to turn off. 
Ending the Call		
What	**How**	**Notes**
Hang up	Select the Red button	Press the red button on the Tandberg remote  1. Press the End button twice – first time will ask if you want to disconnect and the second time will end the call
Standby	Select the Red End button as above	After ending the call – select the 'End' button **twice** to enter the device into Standby mode. **Note**: The system may be set up to enter into Standby mode automatically
Turn off monitor	Select the 'Power' button on monitor remote	If the system does not enter into Standby, select the Power button on the Monitor Remote. **Note:** a red light on the bottom right on base of Monitor will indicate it is powered off.

Using Menu Options Instead of the Remote Control

The most common features of the video conferencing equipment can be easily accessed via the Tandberg remote control. However if you are more comfortable using a "Menu" structure, the following Menu Options are available. These options will show up

Press the center "**OK Menu"** button on the Tandberg remote, and the following options will appear on the bottom of the TV screen:

- ❖ Make Call – can be used to place a call
- ❖ Standby – system will go into auto standby w/in 30 minutes
- ❖ Camera Control – allows user to move / control the camera
- ❖ Presentation – ability to show computer presentation / word documents
- ❖ Services – DO NOT USE THIS (nothing set up)
- ❖ Control Panel – DO NOT USE THIS
- ❖ Close – closes out of the menu

With some of the Menu options, a sub-menu will appear, providing additional options. For example, when you select the Camera Control option, you will be provided with the option of controlling your own camera (Near Camera) or the cameras of the other participants (Far Camera). **Note:** that this feature is not available with all video conferencing equipment.

TANDBERG Remote control TRC4

CHANGE VIDEO SOURCE. Select the desired video source (Main Cam, PC, DocCam, DVD, AUX). Press the video source button again to deselect the video source.

MIC OFF turns your microphone on and off.

Press OK/MENU to show the menu and select menu items.

VOLUME + and – adjusts the Codec volume only and not the monitor volume.

LAYOUT key toggles between full screen and different display layouts.

Press the CALL key to place a call.

CAMERA PRESETS Camera presets define specific camera positions. To activate a preset whilst in a call, simply press and release that number key. Move the camera to the desired position and press and hold a number key for one second to save the current camera position to that number key.

The ALPHANUMERICAL KEYPAD functions in the same manner as a cellular phone.

SNAPSHOT takes a snapshot of your video during a call.

PRESET Press Preset + a number to activate a preset.

SERVICES Press the Services button to open the Services menu.

FAR END Pressing Far End turns Far End control on and off.

HELP Press the Help button to open the User Guide menu

PRESENTATION key switches to a predefined presentation source. If the Presentation key is held down for one second then the Presentation video sources menu will appear.

ARROW keys are used to navigate in the menus and for moving the camera* when the menu is hidden.

Use ZOOM + and – to zoom the camera* in and out.

The SELFVIEW key displays your outgoing video. Press again to turn off.

The CANCEL key takes you back one step in the menu system, i.e. to leave a menu undoing any changes. Use CANCEL to delete characters in an input field. Press and hold the CANCEL key for one second to close the menu.

Use the END CALL key to end the current call. You can also use the END CALL key to exit a menu, and if you press the END CALL key once again the STANDBY menu will be displayed and you can put the system in to STANDBY mode.

Use the PHONE BOOK key to store and recall video contacts for easy placement of calls.

Press TOUCH TONES key when you are in a call and need to dial extension numbers. Toggle between ABC and abc mode by pressing the # key. To switch between letter and 123 mode press the # key for one second. Press the OK/MENU button to exit TOUCH TONES.

* Applies to systems with controllable cameras.

C: Video Conference System Configurations

Table 1. Video conference technology equipment matrix

Visual communication needs	Laptop	Desktop	Enhanced TV or PC	Standalone VCT
Non-emergency, scheduled uses				
See presenter's desktop: PowerPoint, maps, Word documents, other files	●	●	●	With PC add-on
Maximum participants per end-point	2	4	10	50
Public meeting requirements: see each person talking and voting	●	●	●	●
Record event (streaming: in-house or provider recorded via DVD or VCR)	●	●	●	●
Discussion, questions and answer sessions, and distance learning events (lecture-style)	●	●	●	●
Emergency uses – EOC based				
Available 24/7 for scheduled and unscheduled, on-demand sessions	●	●	●	●
Transportable outside of building	●			
Portable within building	●	●	●	●
Watch the person speaking	●	●	●	●
See other people in the room (to notice strain levels and fatigue)			●	●
See maps and other electronic documents	●	●	●	●
View paper documents via document camera[17]			●	●
Maximum participants per end-point	2	4	10	50
Emergency uses – field based				
Transportable	●		●[18]	
Transmit video from field	●			
See onsite personnel when speaking	●			
View maps and documents online	●			
Transfer files and view diagrams	●			
See presenter's desktop (via Webex)	●			

[17] Depends on system options. Document viewing may be possible with a laptop or desktop using a web camera and tripod.

[18] Depending on model.

Table 2 shows four possible video conferencing technology (VCT) options. Excluded options are mobile video conferencing through phones and handhelds and command vehicles with VCTs, all using satellite or cellular tower transmission.

Table 2. Video conferencing technology options

Type	Desktop or laptop	Enhanced TV/ PC	VCT standalone	Room-installed VCT
Photo[19]				
Description	Fixed camera and microphone added to a desktop PC or laptop. May have instant messaging.	Video-audio peripherals and codec[20] added to a flat screen TV or desktop PC with a larger screen.	Self-contained unit with one or two medium-sized screens, built-in audio and video equipment and codec.	Large screens with multiple microphones, speakers, and pan- tilt-zoom cameras, and codec. Room design supports VCT's lighting and acoustical needs.
Quality	→ Increase in audio and video quality, reliability, and user experience (and cost)			
Trend	← Trend is toward PC-based VCT and more use outside of the traditional meeting room.			
Best for	• Presentations or trainings with minimal audience interaction (one-to-many events). • One-to-one, up-close video communication. • Document viewing/sharing. • Cubicle work space.	• Leveraging existing PC or flat screen equipment. • Individual office location.	• Small group capacity. • Movable to different meeting rooms, but must reconnect to network. • High quality, synced video and audio. • Automatic control of audio distortions.	• All participants see each other. A "real" meeting feeling. • Dedicated meeting room. • Large group capacity or use with lecture style seating. • High quality, synced video and audio. • Automatic control of audio distortions.
Initial Cost[21]	$200 to $300 for medium quality.	$7,000 to $11,000	$12,000 to 20,000+	$100,000+ ???

[19] Photos from left to right: Courtesy of Cisco Systems, Inc. Unauthorized use not permitted; TANDBERG Edge 95/85/75 MXP; TANDBERG Profile; and Polycom® Telepresence Experience™ High Definition ((HD).X™ HD).

[20] A key VCT device that compresses video and audio data for faster, higher quality real-time transmission.

[21] These costs are for the user's "end-point" equipment and exclude network equipment and operating

Other VCT costs

- End-point equipment maintenance and repair. Twenty-four hour maintenance contracts are about $1,500 annually.
- Network costs are either infrastructure equipment such as gatekeepers and multi-point control units, or a subscription service. Toll phone charges may apply during VCT use.
- Technical staff for network and user support.
- Appropriate room for locating equipment.

Decision factors

Table 2 compares functional capabilities and costs. Other decision factors are:

- How critical the visual communication needs are, especially person-to-person video compared with viewing the same desktop.
- Transmission quality and reliability. Desktop audio and video transmission quality can be lower because data is transmitted in "packets" rather than real time. Higher-cost VCTs ensure unbroken video and audio transmission and eliminate audio distortions automatically. Many networks give VCT transmission a higher priority over other transmissions. Desktop PC audio requires one person speaking at a time, similar to conference calling.
- People's comfort with the technology. Personal computers and laptops are familiar work tools; VCT units are not and may require frequent use to gain and maintain experience using them successfully.
- Available technical support and user assistance. Like PCs, VCTs require technical support and someone to troubleshoot when problems occur or to assist an infrequent user.

Trends

- Virtual EOCs: Emergency personnel are geographically dispersed but interconnected by computers, with shared access to planning documents and data.
- Web conferencing capabilities are being integrated into mainstream software packages and tools. The State of Minnesota's Microsoft Office contract includes the MS Office Communicator package, which provides instant messaging, video and voice conferencing, and desktop sharing. Virtual EOC software or web services could potentially add web conferencing features.
- The 3G "third generation" wireless network offers greater bandwidth and support for more mobile applications and uses, including video.

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costs. Add-ons such as wireless microphones and document cameras increase the costs by $5,000 to $10,000.

- Like most technology, VCT quality and speed are always improving while costs decline. Emerging Internet Protocol (IP) standards will greatly improve desktop video transmission.
- Video or web conferencing service providers are an alternative to building significant network infrastructure. Examples are "Webex" and renting a VCT room.
- Interoperability: Someone with a PC can hold a video conference with someone using room-based VCT equipment.

Example of three different approaches

Desktop PC Sixteen Texas counties form the North Central Texas Council of Governments. The council provided each county's emergency management program with a desktop camera, speaker, microphone, cables, and remote control.[22] Each emergency management office has an account with the state's web conferencing service.[23]

Enhanced TV or PC The Metro Region counties have purchased the peripherals to add video conferencing capabilities to plasma TV screens or desktop PCs. The units can link up to seven video sites at one time, but additional equipment is required to allow all sites to connect simultaneously.

VCT standalone The California Emergency Management Agency is connecting all 58 counties, 15 state agencies, and regional threat assessment centers to a common VCT network, and providing a 50-inch screen and VCT equipment to entities that do not have them.[24] The network's primary purpose is to allow the governor or other state official to simultaneously communicate with all the endpoints. The network also provides non-emergency regional and multi-point video-conferencing.

[22] More information at http://www.nctcog.org/ep/Special_Projects/VTC/
[23] Login page: http://texasvideoweb.tx.gov/. Imajet Communications, Inc. is the service provider: http://www.imajet.net/
[24] More information at www.calema.ca.gov/vtc